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We claim as our invention:

1. An energy transfer apparatus for facilitating energy transfer into a mass of airway tissue, said apparatus sized to enter a bronchus or bronchiole of a human lung and comprising:

a flexible elongated body having a proximal portion and a distal portion and at least one lumen extending therebetween;

a distally located expandable portion of said elongated body, said expandable portion having a first state and a second state, wherein said second state is radially expanded from said elongated body;

a distal tip located distally of said expandable portion;

at least one energy transfer element at an exterior of said expandable portion, wherein each of said energy transfer elements is configured to contact a wall of the bronchus or bronchiole when said expandable portion is in said second state; and

a deployment member configured to move said expandable portion between said first and second state, said deployment member extending at least between said expandable portion and said proximal portion of said elongated body.

2. The energy transfer apparatus of claim 1 further comprising a temperature detecting element in proximity to said expandable portion.

3. The energy transfer apparatus of claim 1 wherein said energy transferring element each comprises a radio frequency electrode configured to heat the airway tissue by delivering radio frequency energy.

4. The energy transfer apparatus of claim 3 wherein said radio frequency generating electrode is monopolar.

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5. The energy transfer apparatus of claim 3 wherein said radio frequency generating electrode is bipolar.

6. The energy transfer apparatus of claim 1 wherein said energy transferring element each comprises a resistively heated element configured to conductively heat the airway tissue.

7. The energy transfer apparatus of claim 6 wherein each of said resistively heated elements are conductively attached to said expandable portion.

8. The energy transfer apparatus of claim 6 wherein said resistively heated element uses AC current.

9. The energy transfer apparatus of claim 6 wherein said resistively heated element uses DC current.

10. The energy transfer apparatus of claim 6 wherein said resistively heated element uses RF energy.

11. The energy transfer apparatus of claim 1 wherein said energy transferring elements comprise at least one resistively heated element configured to heat the airway tissue and at least one radio frequency generating electrode configured to heat the airway tissue.

12. The energy transfer apparatus of claim 1 wherein a diameter of said expandable portion in said second state is less than 15 mm, and wherein said

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elongated body has a diameter less than said diameter of said expandable portion in said second state.

13. The energy transfer apparatus of claim 1 wherein said expandable portion comprises pre-shaped tines configured to expand upon advancement out a sheath and contract when withdrawn into said sheath, said pre-shaped tines also having a portion which is biased against the wall of the bronchus or bronchiole when said tines are expanded.

14. The energy transfer apparatus of claim 1 wherein said expandable portion comprises a balloon member.

15. The energy transfer apparatus of claim 14 further comprising a fluid which expands said balloon member into said second state.

16. The energy transfer apparatus of claim 15 further comprising a heat generating element within said balloon member, wherein said energy transfer element comprises a surface of said balloon member, and said fluid being configured to conduct heat from said heat generating element to said surface of said balloon member.

17. The energy transfer apparatus of claim 16 further comprising at least one RF electrode at an exterior of said balloon, said RF electrode configured to heat the airway tissue.

18. The energy transfer apparatus of claim 1 further comprising a proximal joint at an intersection of said distal portion and said expandable portion, and wherein said

expandable member comprises a plurality of legs, each of said legs having a first end extending from said proximal joint and a second end terminating at said distal joint, said distal joint being adjacent to said distal tip, each of said legs having a center section substantially parallel to said elongated body and each of said legs being spaced around a circumference of said elongated body to form a basket.

19. The energy transfer apparatus of claim 18 wherein each said basket leg has a circular cross section.

20. The energy transfer apparatus of claim 18 wherein each said basket leg has a rectangular cross section.

21. The energy transfer apparatus of claim 18 wherein at least of one of said legs comprises an electrically conductive material, and said leg functions as said energy transfer element.

22. The energy transfer apparatus of claim 21 wherein said basket legs comprise a stainless steel alloy.

23. The energy transfer apparatus of claim 18 wherein said basket has a length from said proximal joint to said distal joint of less than 35 mm when said basket is in said first state.

24. The energy transfer apparatus of claim 18 wherein said plurality of legs consists of four legs each spaced at approximately 90 degree intervals around said elongated body.

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25. The energy transfer apparatus of claim 18 wherein said plurality of legs consists of five legs each spaced at approximately 72 degree intervals around said elongated body.

26. The energy transfer apparatus of claim 18 wherein said temperature detecting element is attached to a first leg of said plurality of single legs.

27. The energy transfer apparatus of claim 26 further comprising at least one additional temperature detecting element attached said plurality of legs.

28. The energy transfer apparatus of claim 26 wherein said temperature detecting element is attached in thermal communication to said first leg by soldering, welding, adhesive bonding, or other adherents.

29. The energy transfer apparatus of claim 28 wherein said temperature detecting element is a thermocouple having a first and second leads joined separately to said first leg, each lead in electrical communication with said first leg.

30. The energy transfer apparatus of claim 18 wherein a radio frequency electrode is attached to each leg of said basket.

31. The energy transfer apparatus of claim 30 wherein said radio frequency electrode is attached to each leg of said basket by a heat shrink fastener.

32. The energy transfer apparatus of claim 31 wherein said temperature detecting element is placed between at least one of said legs and said heat shrink fastener.

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33. The energy transfer apparatus of claim 18 wherein a resistively heated element is coiled around at least a portion of each legs.

34. The energy transfer apparatus of claim 33 wherein said temperature detecting element is placed between at least one of said legs and said resistively heated element.

35. The energy transfer apparatus of claim 18 wherein a polymeric heating element is on at least a portion of each basket leg.

36. The energy transfer apparatus of claim 18 wherein an electrically conductive paint covers at least a portion of each basket leg.

37 The energy transfer apparatus of claim 18 wherein a printed flex circuit is on at least a portion of each basket leg.

38. The energy transfer apparatus of claim 18 wherein said legs are joined in electrical communication at either proximal, distal, or both joints by soldering, welding, or other means.

39. The energy transfer apparatus of claim 38 wherein said distal joint further comprise an adhesive which fixedly attaches said ends of legs to said joint.

40. The energy transfer apparatus of claim 38 wherein either said proximal or distal joint not in electrical communication is adhesively bonded or thermoformed.

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41. The energy transfer apparatus of claim 18 wherein said elongated body comprises a plurality of basket leg lumens, wherein each of said ends of said basket legs is placed in each lumen.

42. The energy transfer apparatus of claim 18 wherein said plurality of legs is formed from a single sheet.

43. The energy transfer apparatus of claim 42 wherein said sheet is a stainless steel material.

44. The energy transfer apparatus of claim 1 wherein said deployment member further comprises a sheath being slidably coupled and exterior to said elongated body and said expandable portion, and

wherein said expandable portion is resilient and upon advancement out of said sheath said expandable member self expand into said second state.

45. The energy transfer apparatus of claim 1 wherein said deployment member is force compensated to limit a force which said expandable member can apply to the airway while in said second expanded state.

46. The energy transfer apparatus of claim 1 wherein said deployment member further comprises a deflection limiting stop to limit a size of said second state of said expandable member.

47. The energy transfer apparatus of claim 1 wherein said deployment member comprises:

a handle adjacent to a proximal end of said elongated body;

a wire extending from said handle through said lumen of said elongated body

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and fixedly attached to said distal tip; and

and at least a first control member moveably attached to said handle.

48. The energy transfer apparatus of claim 47 wherein said elongated body is slidably attached to said handle;

said elongated body, said wire, and said distal tip are slidably moveable in distal and proximal directions; and further comprising

a stop configured to prevent distal movement of said wire beyond a deployment point, wherein beyond said deployment point distal movement of said elongated body against said non-moving distal tip causes said expansion member to expand to said second state.

49. The energy transfer apparatus of claim 48 further comprising a sheath, said sheath being slidably coupled and exterior to said elongated body and said expandable portion, wherein said expandable portion advances out of a distal end of said sheath to expand to said second state.

50. The energy transfer apparatus of claim 48 wherein said first control member is configured to advance said elongated body and said wire in distal and proximal directions.

51. The energy transfer apparatus of claim 50 further comprising a detent means for maintaining said elongated body distally of said deployment point.

52. The energy transfer apparatus of claim 50 wherein said controlmember is configured to frictionally maintain said elongated body distally of said deployment point.

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53. The energy transfer apparatus of claim 47 further comprising

a sheath external to and covering said elongated body and said expandable portion, said sheath extending from said distal tip to said proximal portion; and wherein

said handle is adjacent to a proximal end of said sheath, said sheath being slidably attached to said handle, said elongate body being rigidly attached to said handle;

said wire, and said distal tip are slidably moveable in distal and proximal directions;

said first control member being attached to said sheath, said first control member moveably secured to said handle, where distal movement of said first control member retracts said sheath distally on said elongate member uncovering said elongate member and said expandable portion; and

a second control member attached to said wire, said second control member moveably secured to said handle, where distal movement of said second control member retracts said distal tip and said expandable portion against said non-moving elongated member causing said expandable portion to radially expand into said second state.

54. The energy transfer apparatus of claim 1 wherein said elongated body has a wall reinforced with a polymeric or metallic member.

55. The energy transfer apparatus of claim 1 wherein said apparatus is sized to fit within a working channel of a bronchoscope.

56. The energy transfer apparatus of claim 55 wherein a diameter of said working channel of said bronchoscope is less than or equal to 2 mm.

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57. The energy transfer apparatus of claim 1 wherein said flexible elongated member has a stiffness sufficient to pass through a working channel seal of a bronchoscope.

58. The energy transfer apparatus of claim 1 wherein said distal tip is configured to minimize gouging of the airway.

59. The energy transfer apparatus of claim 58 further comprising a redundant joint attaching said distal tip to said elongated body.

60. The energy transfer apparatus of claim 58 wherein said distal tip is sized to fit within a bronchoscope.

61. The energy transfer apparatus of claim 1 wherein said deployment member comprises a wire extending from said distal tip to said proximal portion, said wire being configured to provide a current to said energy transfer elements.

62. The energy transfer apparatus of claim 1 wherein said deployment member comprises a wire extending from said distal tip to said proximal portion, said wire being configured to move said expansion portion between said first and second states.

63. The energy transfer apparatus of claim 62 wherein said wire is also configured to provide a current to said energy transfer elements.

64. The energy transfer apparatus of claim 62 wherein said temperature detecting element is attached to a portion of said wire located within said expandable portion.

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65. The energy transfer apparatus of claim 1 wherein a portion of said elongated body is radiopaque.

66. The energy transfer apparatus of claim 1 further comprising a steering member configured to deflect said distal tip in a desired direction.

67. The energy transfer apparatus of claim 1 further comprising a vision member.

68. The energy transfer apparatus of claim 67 wherein said vision system comprises a fiber optic cable extending through said elongated body.

69. The energy transfer apparatus of claim 67 wherein said vision system comprises a CCD chip.

70. The energy transfer apparatus of claim 1 further comprising a power supply configured to deliver energy to through said energy transfer elements to the airway walls.

71. The energy transfer apparatus of claim 70 wherein said power supply is configured to stop delivery of energy if said temperature detecting element detects a predetermined maximum temperature.

72. The energy transfer apparatus of claim 70 wherein said power supply is configured to stop delivery of energy if a predetermined temperature change is not detected within a predetermined time.

73. The energy transfer apparatus of claim 1 wherein said apparatus is sterile.

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74. A kit comprising
an energy transfer apparatus for facilitating energy transfer into a mass of airway tissue, and
a generator configured to deliver energy to said energy transfer apparatus.

75. The kit of claim 74 further comprising a bronchoscope.

76. The kit ~~of claim~~ 74 wherein said energy transfer apparatus is the apparatus of claim 1.

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77. An energy transfer apparatus for facilitating energy transfer into a mass of airway tissue within a lung, said energy transfer apparatus having been rendered sterile for the purposes of prevention of infection of the lung.

78. A modified lung having an artificially altered airway within the lung, said airway being artificially altered by transfer of energy to an airway wall such that the airway wall has an attribute selected from the group consisting of a reduced ability to constrict, an increased airway diameter, an increase in resistance to plugging, and a decrease in resistance to airflow.

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